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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/533,172

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Jolinde Machteld Van De Graaf

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EXAMINER

LAWRENCE JR, FRANK M

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

10/26/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/533,172	Applicant(s) VAN DE GRAAF ET AL.	
	Examiner Frank M. Lawrence	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-8,10-12,14,16,18-21 and 23-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5-8,10-12,14,16,18-21 and 23-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 8, 16, 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 8 recites "the adsorbent" but does not specify which adsorbent in claim 7 is being referred to. Claim 16 is indefinite because it depends from canceled claim 15. For examination it is assumed to depend from claim 14. Claims 18 and 19 are rejected for depending from a rejected parent claim.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 5-7, 14, 16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the UK patent application (GB 2275625 A) in view of Gingrich et al. (6,074,459).
5. GB '625 teaches a process for removing hydrogen sulfide and organic sulfur compounds from a natural gas comprising contacting the gas with sulfolane in an absorber, contacting absorber effluent gas with a type 5A or 13X zeolite (pore diameter of at least 5 angstroms), then regenerating the zeolite with heated product gas from a second adsorber in the presence of water

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that can also be adsorbed on the zeolite (figure, page 1, lines 9-15, page 2, lines 5-31, page 3, lines 10-18, page 4, lines 12-18). The instant claims differ from the disclosure of GB '625 in that water in the feed stream contains water that is removed on a zeolite having a pore diameter of less than 5 angstroms and that a preferred temperature, pressure and gas velocity are used.

6. Gingrich et al. '459 discloses a process for removing contaminants from a natural gas comprising flowing the gas through a first adsorbent bed including a zeolite 3A or 4A for adsorbing water and a second bed including a zeolite for adsorbing sulfur compounds (see col. 3, lines 4-46). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the adsorbent beds of GB '625 by using an upstream bed of zeolite 3A or 4A in order to optimize the capacity of subsequent beds. Absent a proper showing of criticality or unexpected results, the temperature, pressure and flow rate are considered to be parameters that would have been routinely optimized by one having ordinary skill in the art based on the adsorption characteristics and application size.

7. Claims 1, 7, 8, 10-12, 14, 16, 20, 21 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman et al. (4,329,160) in view of Gingrich et al. '459 and taken together with Turnock et al. (3,620,969).

8. Sherman et al. '160 teach a process for removing hydrogen sulfide and mercaptans from a natural gas stream, comprising contacting the stream including up to 5 mole % H_2S with a zeolite having a pore diameter of at least 5 angstroms at a temperature of 60-120° F and a pressure of 200-1200 psi, then regenerating the zeolite with a portion of a hydrocarbon product stream having an appropriate amount of water vapor added, such as 0.185 mole % (see figure, col. 1, lines 1-68, example 1). The instant claims differ from the disclosure of Sherman et al.

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'160 in that the zeolite contains a binder, there is an additional bed of zeolite having a pore diameter of less than 5 angstroms, and that a preferred temperature, pressure and gas velocity are used.

9. Gingrich et al. '459 disclose a natural gas purification method as described in paragraphs 6 above. Turnock et al. '969 teach a process for removing sulfur compounds from a liquid natural gas stream, comprising contacting the stream with a zeolite having a pore diameter of greater than 5 angstroms at a linear velocity of 0.1-20 feet per minute, then regenerating the zeolite with an inert gas containing moisture to a dew point level of 10-160°F and heated to 500-700°F (see col. 2, line 37 to col. 3, line 60, col. 4, lines 27-75, col. 5, lines 46-65). The sulfur compounds can include up to 2 weight % hydrogen sulfide or organic sulfides such as mercaptans, disulfides, thiophene and carbonyl sulfide, and the zeolite can include a binder. It would have been obvious to one having ordinary skill in the art at the time of the invention to use an additional zeolite bed and process parameters for the same reasons given in paragraph 6 above. It would have also been obvious to use a zeolite with a binder in order to provide a sorbent that retains its selectivity and capacity.

Response to Arguments

10. Applicant's arguments filed September 27, 2007 have been fully considered but they are not persuasive. Applicant argues that there is no suggestion to combine the Gingrich et al. '459 teaching of using an additional water adsorbent bed in the system of either GB '625 or Sherman et al. '160. Applicant specifically points out that the GB '625 system likely adds water in the upstream absorption step before contacting with the sulfur adsorbent bed. It is submitted that the suggestion to combine is found in col. 3, lines 4-6 of the Gingrich et al. patent which states,

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“moisture is removed in order to optimize the capacity of subsequent adsorbent beds 2 and 3.”

The principle behind using upstream beds having smaller adsorbent pore diameters is to sequentially remove contaminants based on their molecular size to prevent contamination of downstream beds. Water vapor molecules have a smaller size than the sulfur compounds and would fit into and fill up the sulfur adsorbent pores, decreasing efficiency. If the absorption step in GB ‘625 adds water to the gas, it would be even more useful to provide a water removal “guard” bed upstream of the sulfur adsorbent for protection.

11. The previously presented specification objections and indefiniteness rejections have been overcome and are withdrawn.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank M. Lawrence whose telephone number is 571-272-1161.

The examiner can normally be reached on Mon-Thurs 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Frank M. Lawrence
Primary Examiner
Art Unit 1797

Frank Lawrence
10-24-07

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